USER'S MANUAL
Rev. 11/2015

REVO S 2PH

SOLID STATE RELAY

FROM 280 TO 700 A

00021

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Dichiarazione di Conformità CE
CE Declaration of Conformity

PRODUTTORE:
PRODUCT MANUFACTURER: CD Automation S.R.L.

INDIRIZZO:
ADDRESS: Via Pablo Picasso 34//36
20025 Legnano (Mi)
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Dichiara che il prodotto:
Declare that the product:

RevoS, 2ph da280 a 700A

SODDISFA I REQUISITI DELLA NORMA :

Specifica di sicurezza	EN60947-1 :2008
	EN60947-4-3:2001
Specifica sulle emissioni	EN60947-4-3:2000
Specifica sulle Immunità	EN60947-4-3:2000

FULFILS THE REQUIREMENTS OF THE STANDARD:

Electrical safety Standard	EN60947-1 :2008
	EN60947-4-3:2001
Generic Emission standard	EN60947-4-3:2000
Generic Immunity standard	EN60947-4-3:2000

CDAutomation dichiara che I prodotti sopra menzionati sono conformi alla direttiva

CDAutomation declares that The products above mentioned they am conforming to the directive

EMC 2004/108/CEE e alla direttiva Bassa Tensione (low Voltage) **2006/95/CEE**

DESCIZIONE DEL PRODOTTO: Unità di controllo potenza elettrica
PRODUCT DESCRIPTION: Elettric power controll

UTILIZZO: Controllo processi termici
SCOPE OF APPLICATION: Thermal controll process

Data di emissione: 20/04/2010
Issued on: 20/04/2010

Amministratore Unico e
Legale Rappresentante
Claudio Brizzi

1 Important warning for safety

The Thyristor unit are integral part of industrial equipments.
When it is supply, the Thyristor unit is subject to dangerous tensions. Don't remove the plastic cover.
Don't use this unit in aerospace and nuclear application.

Electric Shock Hazard (Rischi di scosse elettriche, Risque de choque électrique)
When thyristor unit has been connected to main supply voltage and is switched off, before to touch it be secure that the unit is isolated and wait at least one minute to allow discharging internal capacitors.
Thus be secure that:

- access to thyristor unit is only permitted to specialised personnel;
- the authorised personnel must read this manual before to have access to the unit;
- the access to the unit must be denied to unauthorised personnel.

Important warnings (Avvertenze importanti, attention)
During the operations with units under tension, local regulations regarding electrical installation should be rigidly observed:

- Respect the internal safety rules.
- Don't bend components to maintain insulation distances.
- Protect the units from high temperature humidity and vibrations.
- Don't touch components to prevent electrostatic discharges on them.
- Verify that the size is in line with real needs.
- To measure voltage current etc. on unit, remove rings and other jewels from fingers and hands.
- Authorized personnel that work on thyristor unit under power supply voltage must be on insulated board

This listing does not represent a complete enumeration of all necessary safety cautions

Protection (Protezione, Protection)
The unit have IP20 protection rating as defined by the specific international. Is necessary consider the place of installation.

Earth (Messa a terra, Terre)
For safety, the Thyristor unit with isolated heat-sink must be connected to earth.
Earth impedance should be correspondent to local earth regulation. Periodically the earth efficiency should be inspected.

Electromagnetic compatibility (Compatibilità elettromagnetica, Compatibilité électromag.)
Our thyristor units have an excellent immunity to electromagnetic interferences if all suggestions contained in this manual are respected. In respect to a good Engineering practice, all inductive loads like solenoids contactor coils should have a filter in parallel

Emissions (Emissioni, Emission)
All solid-state power controllers emit a certain amount of radio-frequency energy because of the fast switching of the power devices. The CD Automation's Thyristor unit are in accord with the EMC norms, CE mark.
In most installations, near by electronic systems will experience no difficulty with interference. If very sensitive electronic measuring equipment or low-frequency radio receivers are to be used near the unit, some special precautions may be required. These may include the installation of a line supply filter and the use of screened (shielded) output cable to the load.

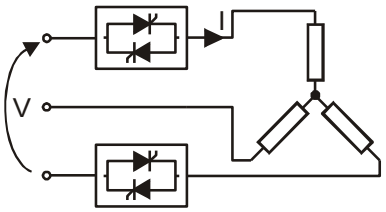
CE

2 Basic Connections and sizing

Star wiring with resistive load (control on two phases with REVO M-2PH)

$$I = \frac{P}{1{,}73V}$$

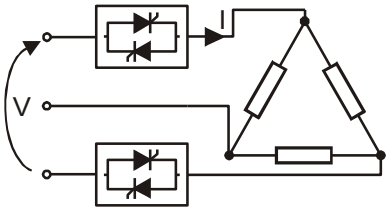
V = Nominal voltage of the load
I = Nominal current of the load
P = Nominal power of the load



Delta wiring with resistive load (control on two phases with REVO M-2PH)

$$I = \frac{P}{1{,}73V}$$

V = Nominal voltage of the load
I = Nominal current of the load
P = Nominal power of the load

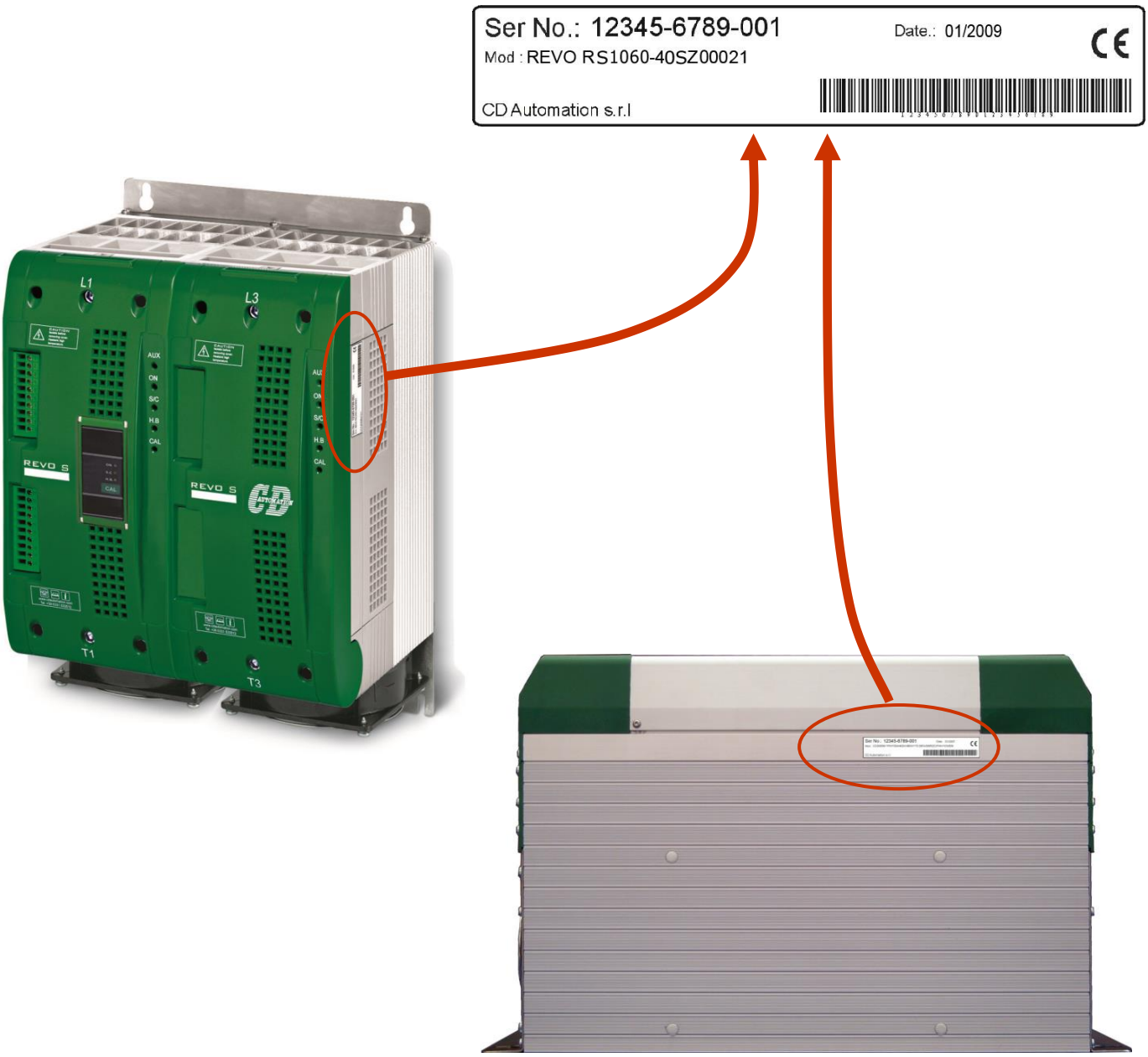


3 Identification and Order Code

3.1 Identification of the unit

Caution: *Before to install, make sure that the Thyristor unit have not damages. If the product has a fault, please contact the dealer from which you purchased the product.*

The identification's label give all the information regarding the factory settings of the Thyristor unit, this label is on the unit, like represented in figure.
Verify that the product is the same thing as ordered .



3.2 Order Code

	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16
REVO S - 2PH	R	S	2	_	_	_	-	_	_	_	_	_	_	_	_	_	_

4, 5, 6 Current

Description code	Numeric code
280A	2 8 0
400A	4 0 0
450A	4 5 0
500A	5 0 0
600A	6 0 0
700A	7 0 0

7 Max Voltage

Description code	Numeric code
480V	4
600V	6

8 Aux. Voltage supply (1)

Description code	Numeric code
90:130V	1
170:265V (1)	2
230:345V	3
300:530V (1)	5
510:690V	6

9 Input

Description code	Numeric code
SSR	S
0:10V dc	V
4:20mA	A

10 Firing

Description code	Numeric code
Zero Crossing ZC	Z
Burst Firing 4 Cycles On at 50% Power Demand	4 (2)
Burst Firing 8 Cycles On at 50% Power Demand	8 (2)
Burst Firing 16 Cycles On at 50% Power Demand	6 (2)

11 Control Mode

Description code	Numeric code
Open Loop	0

12 Fuse & Option

Description code	Numeric code
Fixed Fuses (IF)	F
Fixed Fuses +CT	Y
Fixed Fuses +CT +HB	H

13 Fan Voltage

Description code	Numeric code
Fan 110V	1
Fan 220V Std Version	2

LEGEND
IF = Internal Fixed Fuse
CT = Current Transformer
HB = Heater Break Alarm

Note (1): Standard Value (other value on request)
Note (2): Available only with Analog input

14 Approvals

Description code	Numeric code
CE EMC For European Market	0
cUL For American Market, (pending)	L

15 Manual

Description code	Numeric code
None	0
Italian Manual	1
English Manual	2
German Manual	3
French Manual	4

16 Version

Description code	Numeric code
Std with fixed Fuses	1

4 Technical Specifications

4.1 General features:	
Cover and Socket material:	PolymericV2
Utilization Category	AC-51 AC-55b
IP Code	20
Method of Connecting	Load in Delta, Load in Star
Auxiliary voltage:	90:130V (10 VA Max) 170:265V (10 VA Max) 230:345V (10 VA Max) 300:530V (10 VA Max) 510:690V (10 VA Max)
Relay output for Heater Break Alarm (only with HB option):	0.5A a 125VAC

4.2 Input features:	
Logic input SSR:	5 ÷ 30Vdc 5mA Max (ON ≥ 4Vdc OFF < 1Vdc)
Analogic input	0 ÷ 10Vdc impedance 15 K ohm
Analogic input	4 ÷ 20mA impedance 100 ohm
POT	15 K ohm min.
Digital Input	4 ÷ 24Vdc 5mA Max (ON ≥ 4Vdc OFF < 1Vdc)

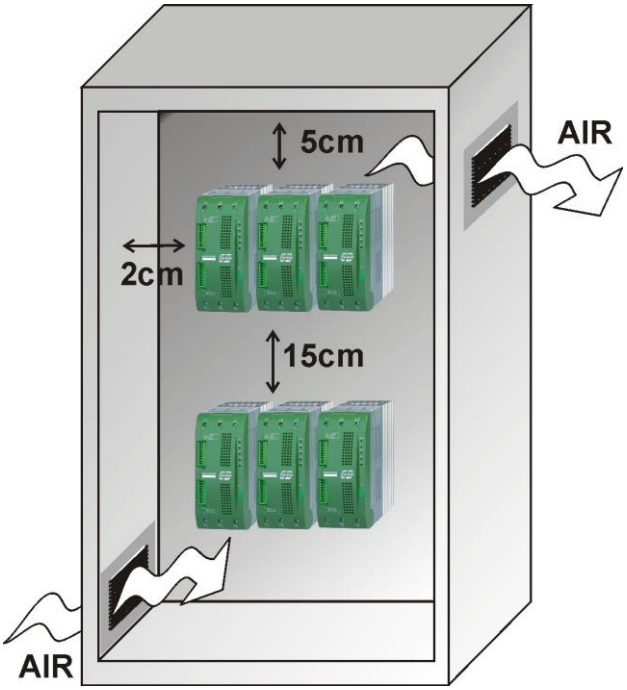
4.3 Output features (power device):

Current	Nominal Voltage range (Ue)	Repetitive peak reverse voltage (Uimp)		Latching current	Max peak one cycle	Leakage current	I^2T value max	Frequency range	Power loss	Isolation Voltage (Ui)
(A)	(V)	(480V)	(600V)	(mAeff)	(10msec.) (A)	(mAeff)	tp=10msec	(Hz)	I=Inom (W)	Vac
280A	24÷600	1200	1600	300	4800	15	236000	47÷70	560	2500
400A	24÷600	1200	1600	200	7800	15	300000	47÷70	875	2500
450A	24÷600	1200	1600	200	7800	15	300000	47÷70	1021	2500
500A	24÷600	1200	1600	200	8000	15	306000	47÷70	1061	2500
600A	24÷600	1200	1600	1000	17800	15	1027000	47÷70	1178	2500
700A	24÷600	1200	1600	1000	17800	15	1027000	47÷70	1425	2500

4.4 Fan Specification			
Size		CE Number of fans	c UL us LISTED Number of fans
S10	280A	Two Fans - (17W x 2) 34W	Two Fans - (17W x 2) 34W
S14	400A, 500A, 600A	Two Fans - (17W x 2) 34W	Four Fan - (17W x 4) 68W
S14	450A, 700A	Four Fan - (17W x 4) 68W	Four Fan - (17W x 4) 68W

5 Installation

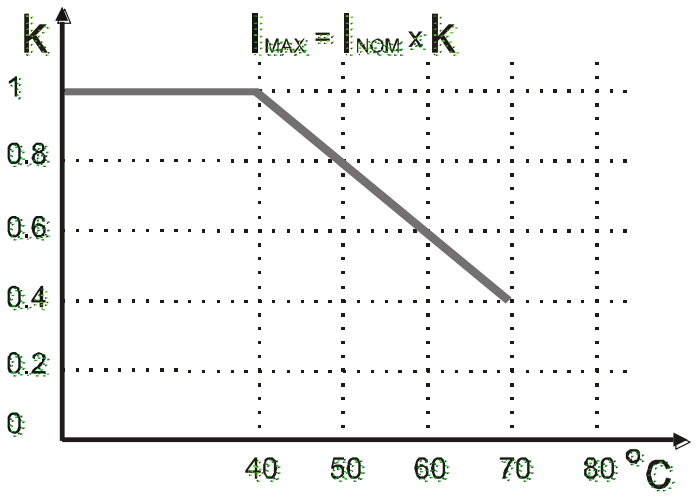
Before to install, make sure that the Thyristor unit have not damages.
If the product has a fault, please contact the dealer from which you purchased the product.
Verify that the product is the same thing as ordered.
The Thyristor unit must be always mounted in vertical position to improve air cooling on heat-sink.
Maintain the minimum distances in vertical and in horizontal as represented.
When more unit has mounted inside the cabinet maintain the air circulation like represented in figure.
Sometimes is necessary installing a fan to have better air circulation.



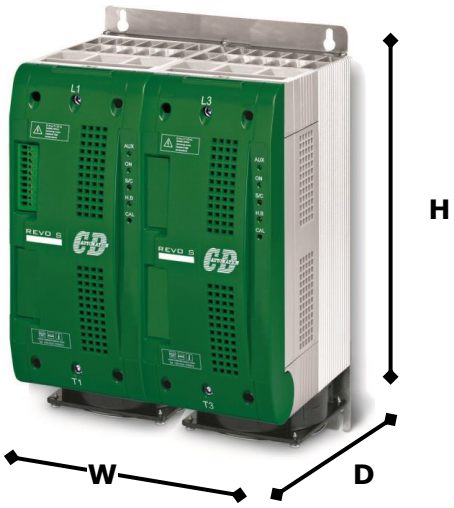
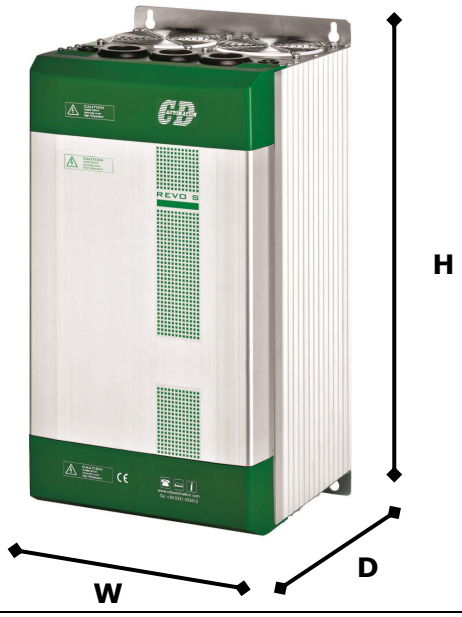
5.1 Environmental installation conditions

Ambient temperature	0-40°C at nominal current. Over 40°C use the derating curve.
Storage temperature	-25°C a 70°C
Installation place	Don't install at direct sun light, where there are conductive dust, corrosive gas, vibration or water and also in salty environmental.
Altitude	Up to 1000 meter over sea level. For higher altitude reduce the nominal current of 2% for each 100m over 1000m
Humidity	From 5 to 95% without condense and ice
Pollution Level	Up to 2nd Level ref. IEC 60947-1 6.1.3.2

5.2 Derating Curve

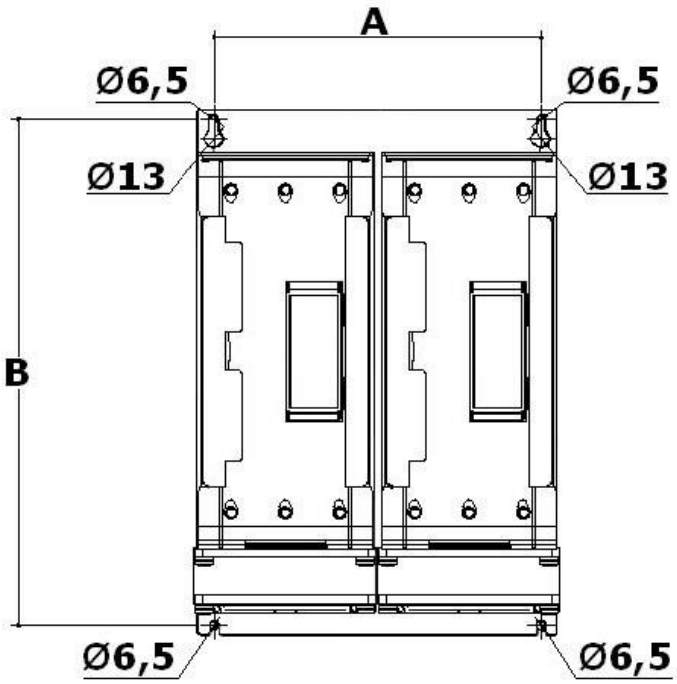
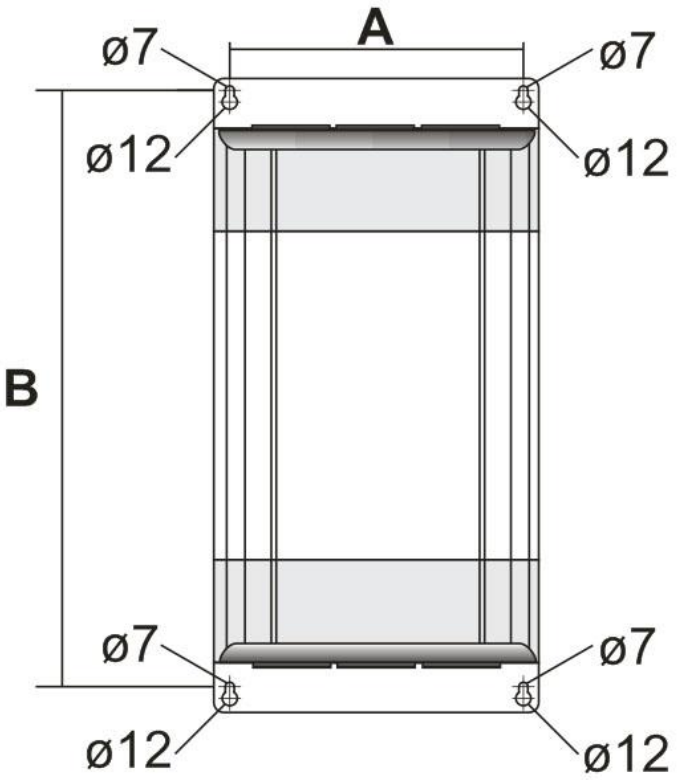


5.3 Dimensions and Weight

REVO-S 2PH 280A (S10)	REVO-S 2PH 400A÷700A (S14)
	

Size	W(mm)	H(mm)	D(mm)	Weight (kg)
280A (S10)	240	350	230	11
400A (S14)	262	520	270	22,5
450A (S14)	262	520	270	22,5
500A (S14)	262	520	270	22,5
600A (S14)	262	520	270	22,5
700A (S14)	262	520	270	22,5

5.4 Fixing holes

REVO-S 2PH 280A (S10)	REVO-S 2PH 400A÷700A (S14)
	

Size	A(mm)	B(mm)
280A (S10)	215	335
400A (S14)	222	490
450A (S14)	222	490
500A (S14)	222	490
600A (S14)	222	490
700A (S14)	222	490

6 Wiring instructions

The Thyristor unit could be susceptible to interferences lost by near equipments or by the power supply, for this reason in accord to the fundamental practices rules is opportune take some precautions:

- The coil contactor, the relays and other inductive loads must be equipped with opportune RC filter.
- Use shielded bipolar cables for all the input and output signals.
- The signal cables must not be near and parallel to the power cables.
- Local regulations regarding electrical installation should be rigidly observed.

Use copper cables and wires rated for use at 75°C only.

6.1 Removing the cover

Instructions for open the thyristor unit S10

Instructions for open the thyristor unit size S14

6.2 Power cable torque (suggested)

Current	Connector Type	Torque Lb-in (N-m)	Wire Range AWG / kcmil	Wire Terminal
280A (S10)	Bus Bar with M8 screw	505 (57.0)	2x1/0 300	UL Listed (ZMVV) Copper Tube Crimp. Lug
400A (S14)	Bus Bar with M10 screw	505 (57.0)	2x3/0 600	UL Listed (ZMVV) Copper Tube Crimp. Lug
450A (S14)	Bus Bar with M10 screw	505 (57.0)	Bus bar 30x6mm	
500A (S14)	Bus Bar with M10 screw	505 (57.0)	Bus bar 60x4mm	
600A (S14)	Bus Bar with M10 screw	505 (57.0)	Bus bar 60x5mm	
700A (S14)	Bus Bar with M10 screw	505 (57.0)	Bus bar 60x6mm	

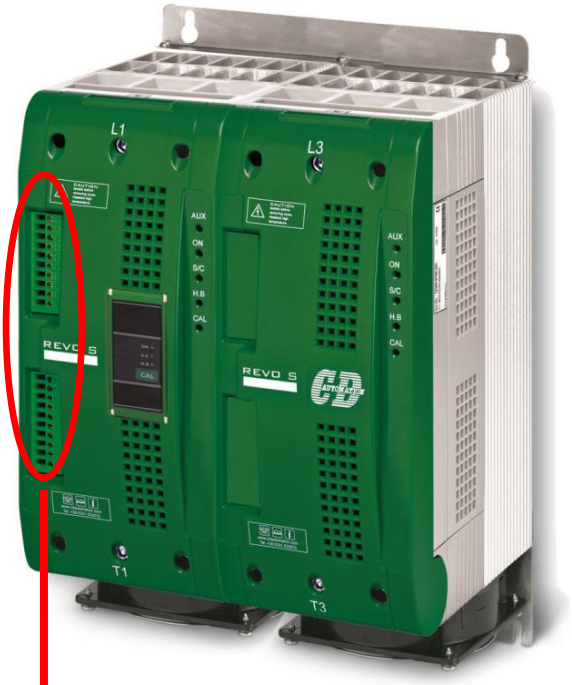
6.3 Power cable dimensions (suggested)

Current	Supply			Load		
	Cable		Screw	Cable		Screw
	mm²	AWG	M	mm²	AWG	M
280A (S10)	120	4/0	M8	120	4/0	M8
400A (S14)	2 x 95	2 x 3/0	M10	2 x 95	2 x 3/0	M10
450A (S14)	Bus Bar		30 x 6 mm	Bus Bar		30 x 6 mm
500A (S14)	Bus Bar		60 x 4 mm	Bus Bar		60 x 4 mm
600A (S14)	Bus Bar		60 x 5 mm	Bus Bar		60 x 5 mm
700A (S14)	Bus Bar		60 x 6 mm	Bus Bar		60 x 6 mm

6.4 Cable dimensions (suggested) of Earth and of the Command Terminals

Current	Earth			Command Terminals		
	Cable		Screw	Cable		
	mm²	AWG	M	mm²	AWG	
280A (S10)	50	1	M8	0,50	18	
400A (S14)	50	1	M8	0,50	18	
450A (S14)	70	1/0	M8	0,50	18	
500A (S14)	70	1/0	M8	0,50	18	
600A (S14)	70	1/0	M8	0,50	18	
700A (S14)	70	1/0	M8	0,50	18	

6.5 Terminals Positions



REVO-S 2PH 280A (S10)	REVO-S 2PH 400A÷700A (S14)

6.6 Power Terminals

Warning: *Before connecting or disconnecting the unit check that power and control cables are isolated from voltage sources.*

Terminal	Description
L1	Line Input Phase 1
L2	Line Input Phase 2 (only S14)
L3	Line Input Phase 3
T1	Load Output Phase 1
T2	Load Output Phase 2 - Not controlled by the thyristor (only S14)
T3	Load Output Phase 3

6.7 Command Terminals for SSR Input only on S10 (280A)

Warning: *Before connecting or disconnecting the unit check that power and control cables are isolated from voltage sources.*

Standard Terminals

Terminal	Description
1	Aux – Voltage Supply for elettronic boards (See order code for the Value)
2	Not Connected
3	Aux – Voltage Supply for elettronic boards (See order code for the Value)
4	Not Connected
5	Fan supply voltage (230V standard – 115V option)
6	Fan supply voltage (230V standard – 115V option)
7	Not Connected
8	Not Connected
9	+ Input SSR
10	- Input SSR

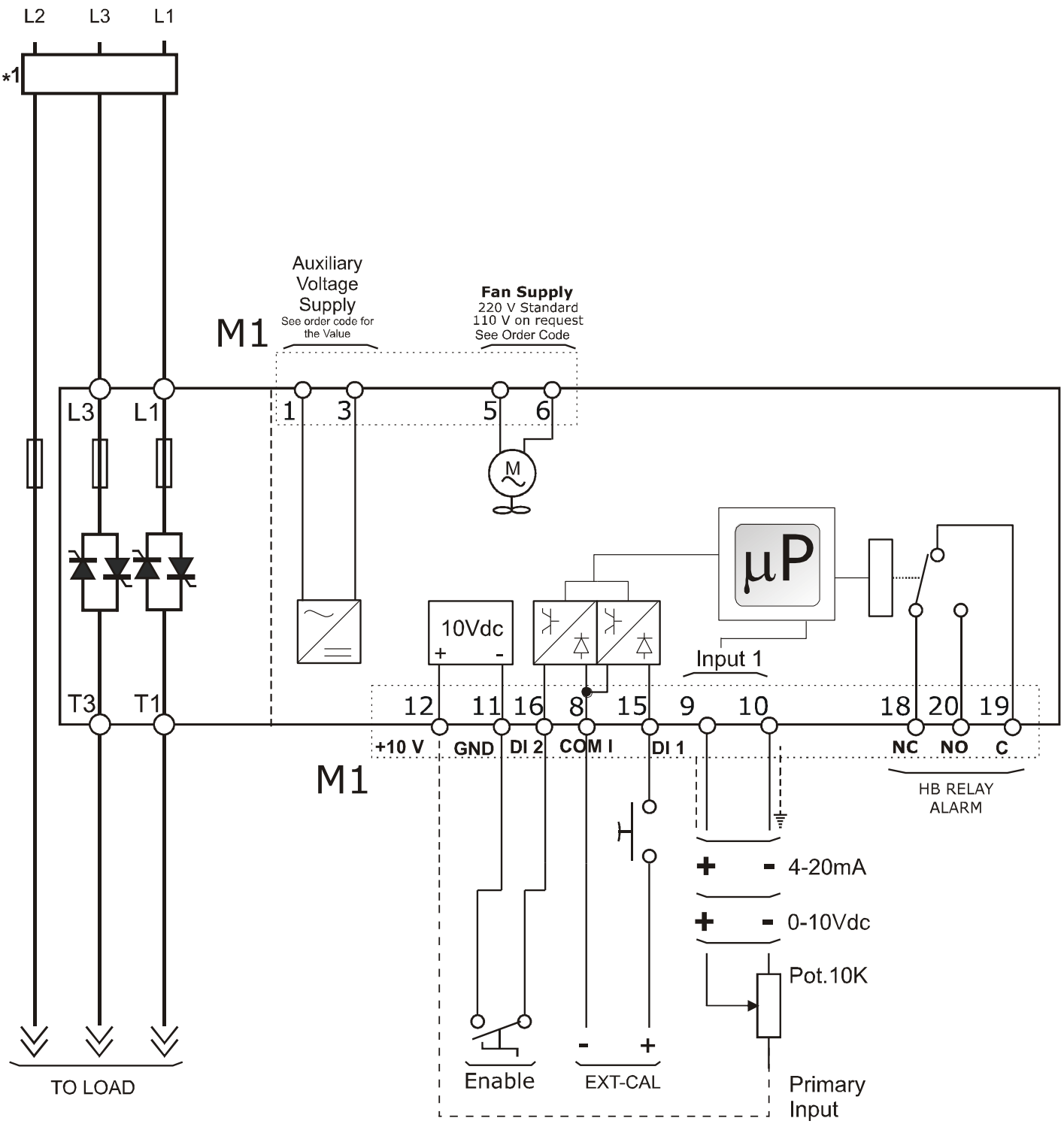
6.8 Command Terminals for Analog Input or SSR input with HB S10(280A)

Terminal	Description
1	Aux – Voltage Supply for elettronic boards (See order code for the Value)
2	Not Connected
3	Aux – Voltage Supply for elettronic boards (See order code for the Value)
4	Not Connected
5	Fan supply voltage (230V standard – 115V option)
6	Fan supply voltage (230V standard – 115V option)
7	Not Connected
8	- Cal Ext. 12/24Vdc
9	+ Control Input (SSR/0-10Vdc/4-20mA)
10	- Control Input (SSR/0-10Vdc/4-20mA)

Terminal	Description
11	0V GND
12	Output +10Vdc stabilized 1 mA MAX
13	Not Connected
14	Not Connected
15	+ Cal Ext. 12/24Vdc
16	Enable
17	Not Connected
18	NC - Normally Close contact alarm relay output (HB)
19	C - Common contact alarm relay output
20	NO - Normally Open contact alarm relay output (HB)

6.9 Schematic on S10 (280A)

Caution: *this procedure must be performed only by qualified persons.*

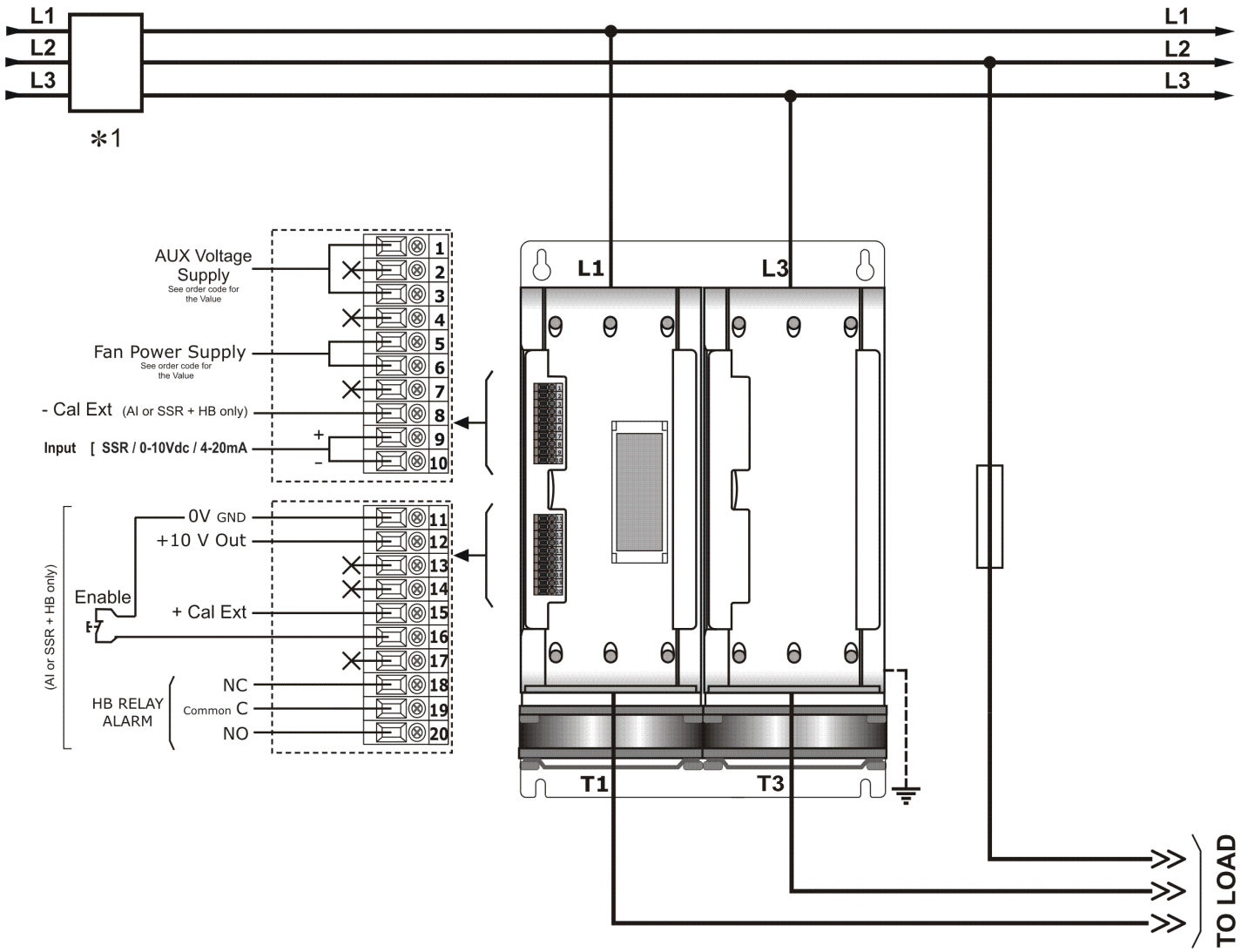


NOTE:

- *1 *The user installation must be protecting by electromagnetic circuit breaker or by fuse isolator. The semiconductor I2t should be 20% less than power controller I2t. Semiconductor fuses are classified for UL as supplemetar protection for semiconductor. They are note approved for branch circuit protection.*

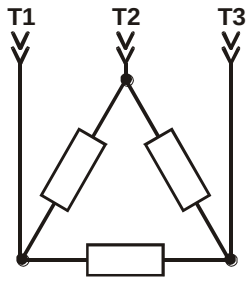
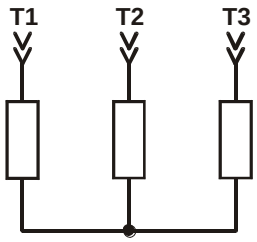
Caution: *this procedure must be performed only by qualified persons.*

6.10 Connection Diagram for 3 phases (control on 2 phases) on S10 280A



X = not connected

*1 The user installation must be protecting by electromagnetic circuit breaker or by fuse isolator.
The semiconductor I2t should be 20% less than power controller I2t.
Semiconductor fuses are classified for UL as supplemetar protection for semiconductor.

Load Type	
 Delta	 Star

6.11 Commmand Terminals for SSR Input only on S14 (400-700A)

Warning: *Before connecting or disconnecting the unit check that power and control cables are isolated from voltage sources.*

Standard Terminals

Terminal	Description
1	Not Connected
2	Not Connected
3	Not Connected
4	Not Connected
5	Not Connected
6	Not Connected
7	Not Connected
8	Not Connected
9	Not Connected
10	Not Connected

Terminal	Description
11	- Input SSR
12	+ Input SSR
13	Not Connected
14	Not Connected
15	Fan supply voltage (230V standard – 115 option)
16	Fan supply voltage (230V standard – 115 option)
17	Not Connected
18	Aux – Voltage Supply for elettronic boards (See order code for the Value)
19	Not Connected
20	Aux – Voltage Supply for elettronic boards (See order code for the Value)

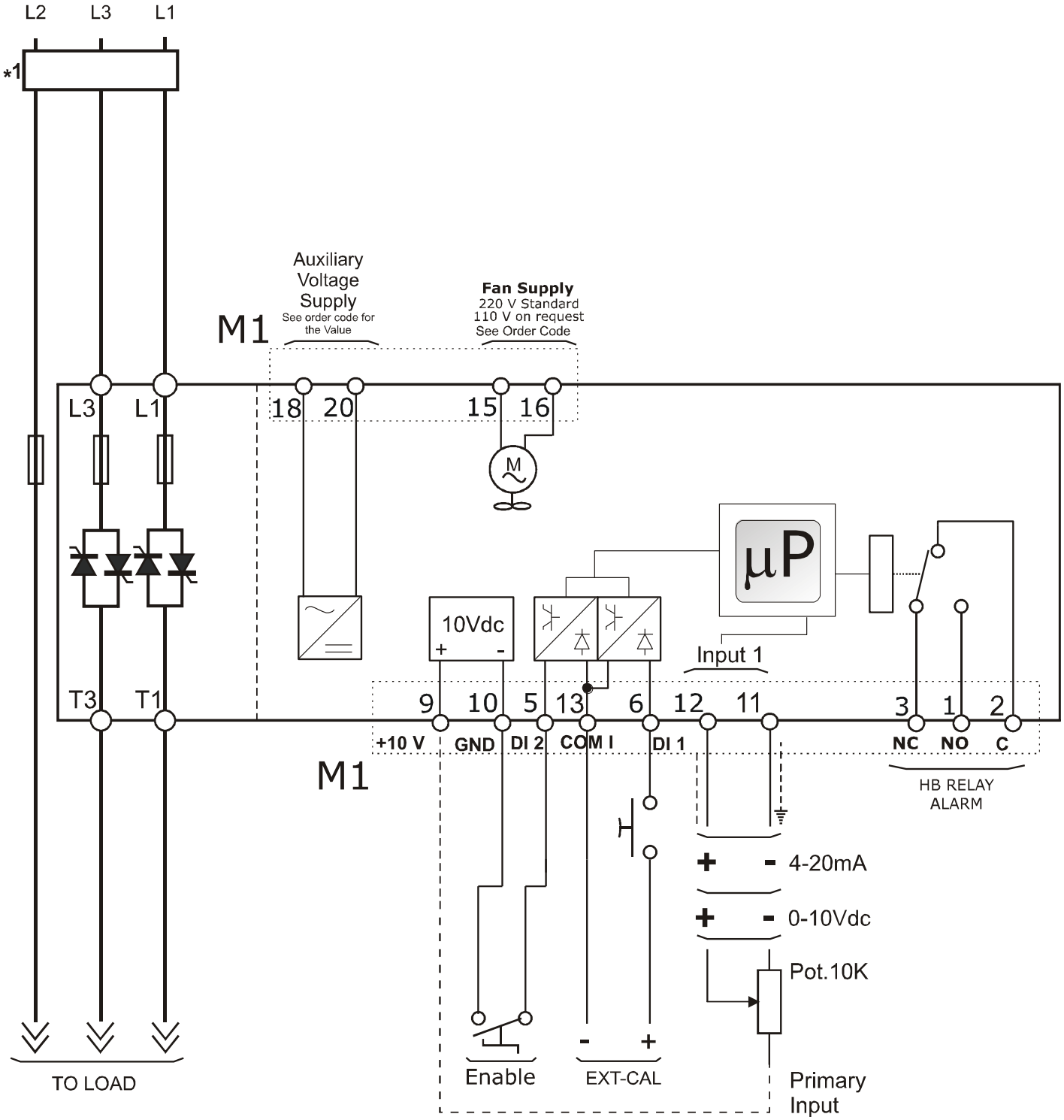
6.12 Command Terminals for Analog Input or SSR input with HB S14(400-700A)

Terminal	Description
1	NO - Normally Open contact alarm relay output (HB)
2	C - Common contact alarm relay output
3	NC - Normally Close contact alarm relay output (HB)
4	Not Connected
5	Enable
6	+ Cal Ext. 12/24Vdc
7	Not Connected
8	Not Connected
9	Output +10Vdc stabilized 1 mA MAX
10	0V GND

Terminal	Description
11	- Control Input (SSR/0-10Vdc/4-20mA)
12	+ Control Input (SSR/0-10Vdc/4-20mA)
13	- Cal Ext. 12/24Vdc
14	Not Connected
15	Fan supply voltage (230V standard – 115 option)
16	Fan supply voltage (230V standard – 115 option)
17	Not Connected
18	Aux – Voltage Supply for elettronic boards (See order code for the Value)
19	Not Connected
20	Aux – Voltage Supply for elettronic boards (See order code for the Value)

6.13 Schematic on S14 (400-700A)

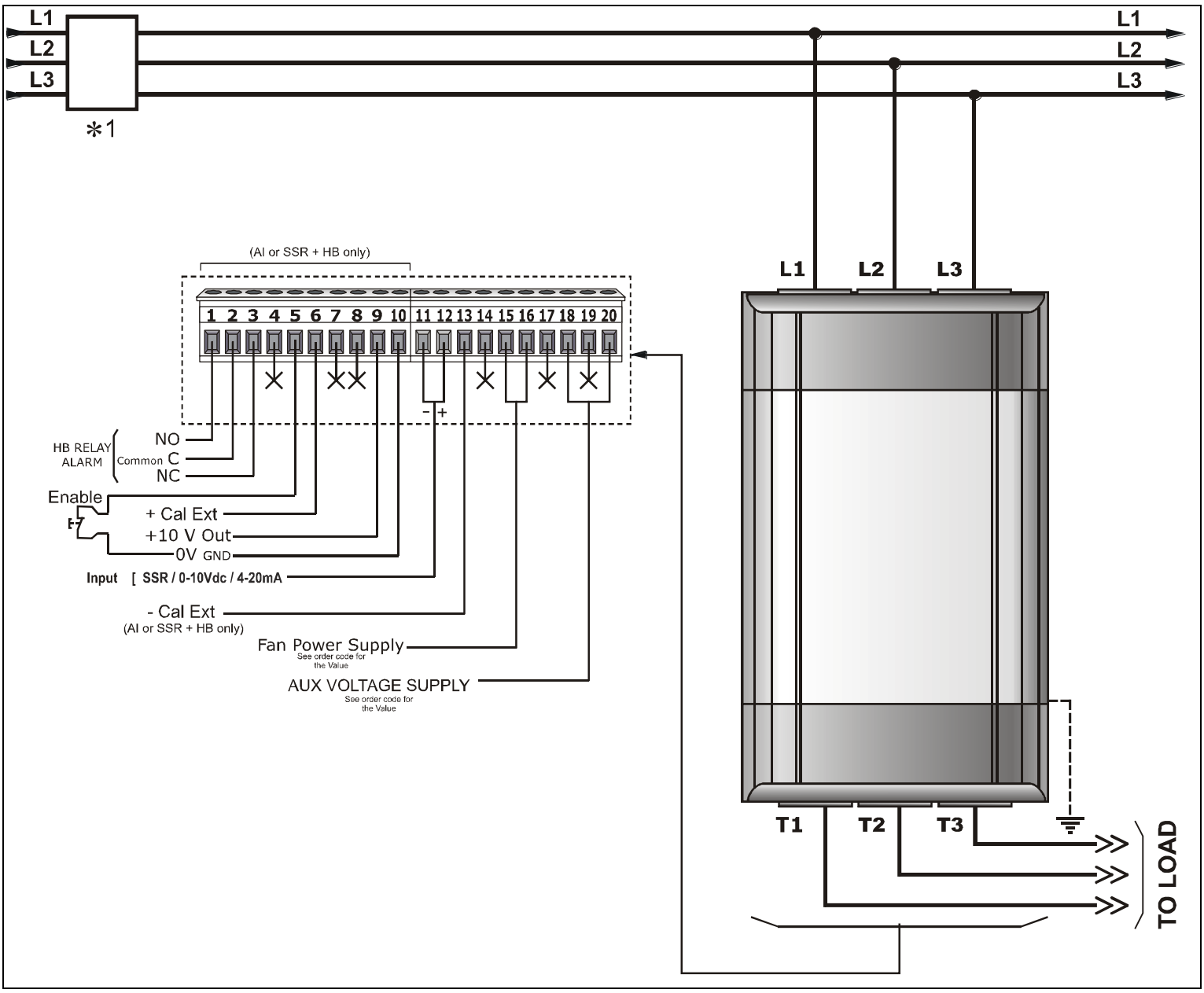
Caution: *this procedure must be performed only by qualified persons.*



NOTE:

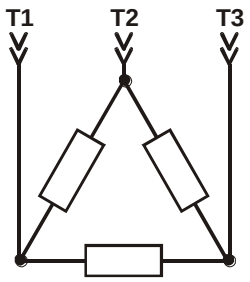
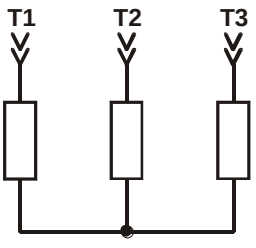
- *1 *The user installation must be protecting by electromagnetic circuit breaker or by fuse isolator. The semiconductor I2t should be 20% less than power controller I2t. Semiconductor fuses are classified for UL as supplemetar protection for semiconductor. They are note approved for branch circuit protection.*

6.14 Connection Diagram for 3 phases (control on 2 phases) on S14 400-700A



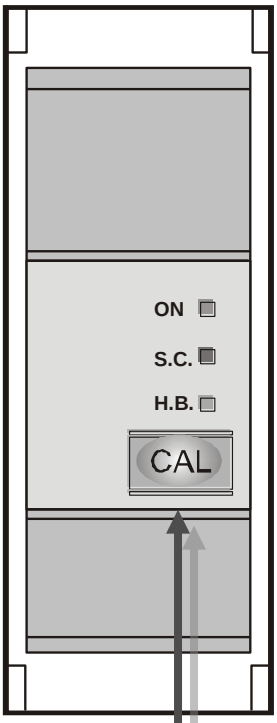
X = not connected

*1 The user installation must be protecting by electromagnetic circuit breaker or by fuse isolator.
The semiconductor I2t should be 20% less than power controller I2t.
Semiconductor fuses are classified for UL as supplemetar protection for semiconductor.

Load Type	
 Delta	 Star

7 Led status and Alarms

LED	STATUS	DESCRIPTION
H.B. S.C.	LED OFF	Load OK
	LED ON (Yellow)	Load Fault (only with HB option)
	LED ON (Red)	SCR short circuit (only with HB option)
ON	LED OFF	Load is NOT powered
	LED ON (Green)	Load is powered



8 Heater Break alarm and SCR short circuit (HB Option only)

Caution: *to work properly the load must be powered at least about 160msec.*

The Heater Break circuit read the load current with an Internal current transformer (C.T.).
Minimum current is 10% of the current transformer size.
If load current is below this value the Heater Break Alarm doesn't work properly.

Heater break Calibration procedure

An automatic function sets the Heater Break Alarm.
The auto setting function can be activated using the "CAL" button on front unit, or supply with 12-24Vdc the digital input "Cal Ext." (See Connection Diagram).
The Heater Break calibration procedure is performed in this way:

- The Unit gives the maximum voltage output
- all LEDS are on, this means that calibration procedure is active
- The current value is stored in memory
- After about 15 second the unit comes back to the initial situation

If load current decreases for partial or total load failure (sensitivity 20%) the yellow LED HB become ON and alarm relay change status.
If the unit is still in conduction with no input signal (LED green OFF) it means that there is a short circuit on thyristors and red LED (SC) become ON.
If the load has been changed the Heater Break calibration procedure must be done again

9 Supply the Electronic Board

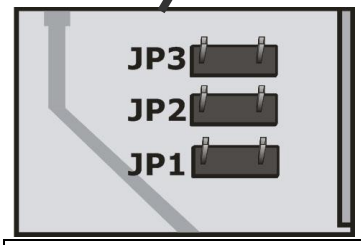
The REVO S thyristor unit, to work, requires a voltage supply for the electronic boards. The Max consumption is 10VA.
The voltage supply for the electronic boards is configured in line with customer requirements that are defined in the Order Code. The Order Code is written on the identification label.

Warning: *Before connecting or disconnecting the unit check that power and control cables are isolated from voltage sources.*

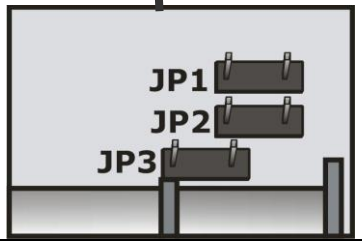
S10 Terminal	S14 Terminal	Description
1	18	Voltage Supply for Electronic Boards
2	19	Not Used
3	20	Voltage Supply for Electronic Boards

To change auxiliary supply voltage sold the correct link-jumper on board
The type of mounted transformer depends of the chosen Voltage in the order code.

S10



S14



Transformer Type	Link-Jumper JP1+JP2	Link-Jumper JP3
TR-605 120V	90:130V	170:265V
TR-605 230V	170:265V	300:530V
TR-605 300V	230:345V	510:690V

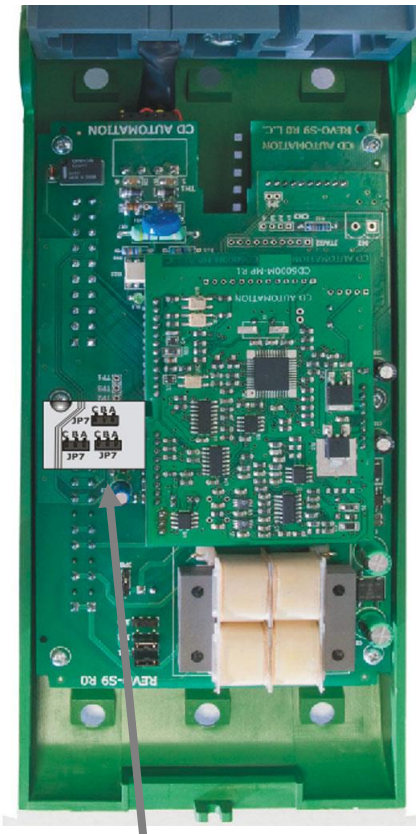
If the Auxiliary Voltage (written on the identification label) is different from Supply Voltage (to the load), use an external transformer with primary equal to load voltage and secondary equal to the Auxiliary Voltage

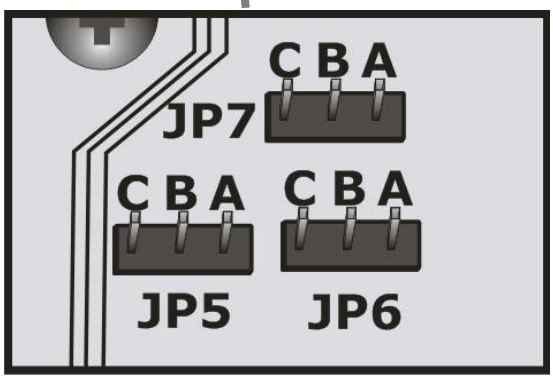
10 Input setting

The input type is already configured in line with customer requirements that are defined in the Order Code. However, verify that the jumper are set as below represented:

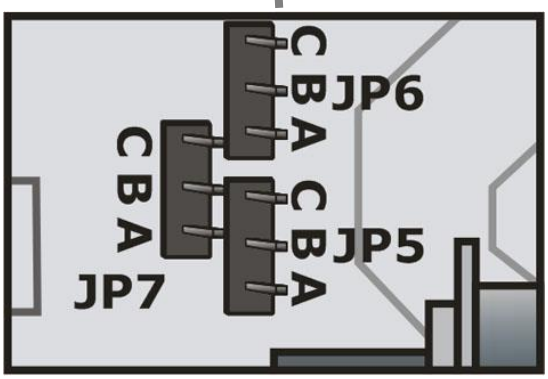
Warning: *Before operate, be sure that power and control cables are isolated from voltage sources*

S10





S14



	0 ÷ 10	4 ÷ 20	SSR
A B C JP5	B-C	B-C	A-B
A B C JP6	B-C	B-C	A-B
A B C JP7	B-C	A-B	-

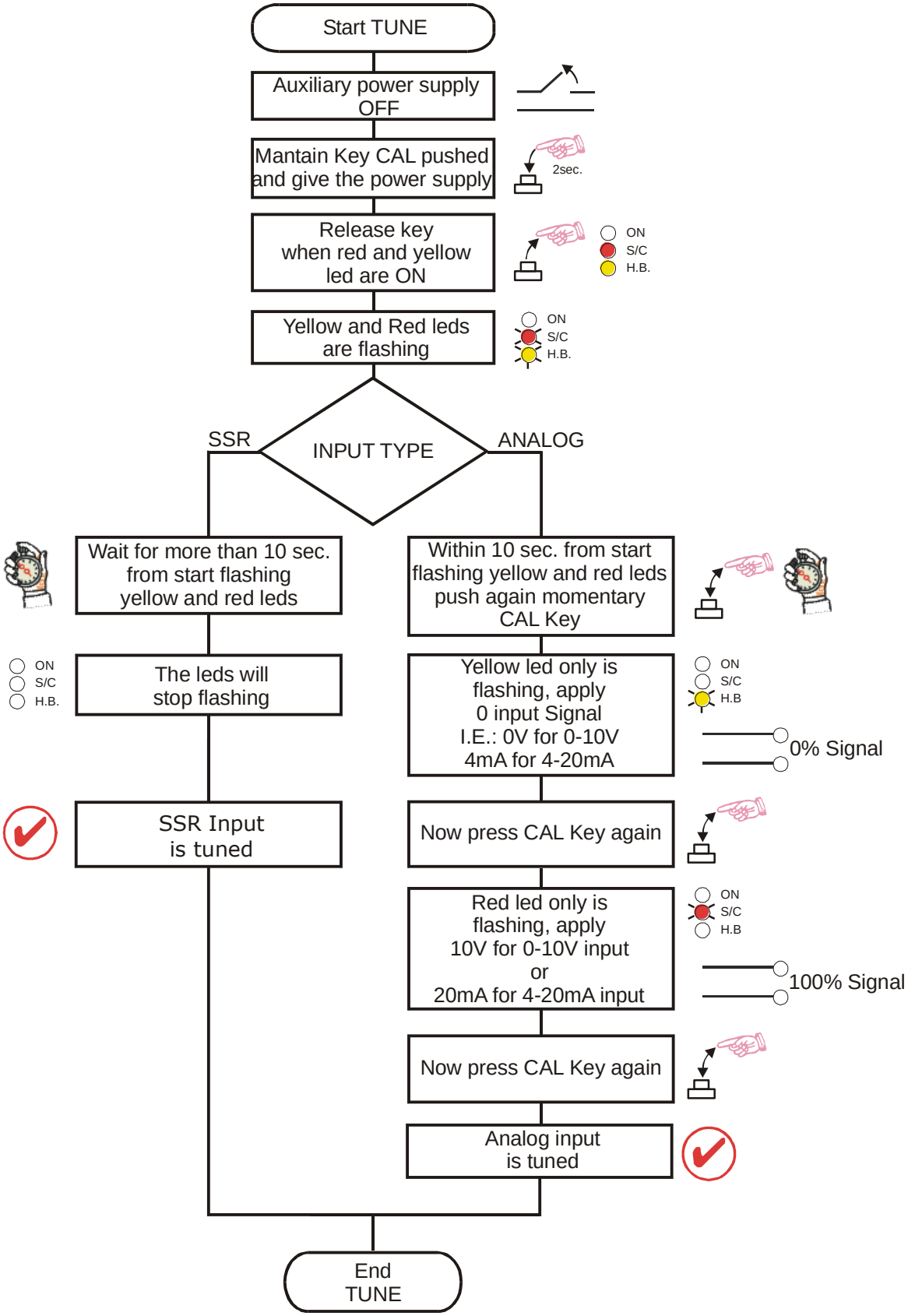
Type	Input features	
0÷10V (default)	Impedance	15KΩ
POT	Impedance	10KΩ min
4÷20mA	Impedance	100Ω

0-10 Vdc/4-20 mA Jumper settings are only for Analog Input option.

10.1 Input calibration procedure

Warning: *this procedure can be done just by specialized personnel*

This procedure is needed only if you change the input type


Start TUNE
Auxiliary power supply OFF
Mantain Key CAL pushed and give the power supply
2sec.
Release key when red and yellow led are ON
ON
S/C
H.B.
Yellow and Red leds are flashing
INPUT TYPE
SSR
ANALOG
Wait for more than 10 sec. from start flashing yellow and red leds
The leds will stop flashing
SSR Input is tuned
Within 10 sec. from start flashing yellow and red leds push again momentary CAL Key
Yellow led only is flashing, apply 0 input Signal I.E.: 0V for 0-10V 4mA for 4-20mA
0% Signal
Now press CAL Key again
Red led only is flashing, apply 10V for 0-10V input or 20mA for 4-20mA input
100% Signal
Now press CAL Key again
Analog input is tuned
End TUNE

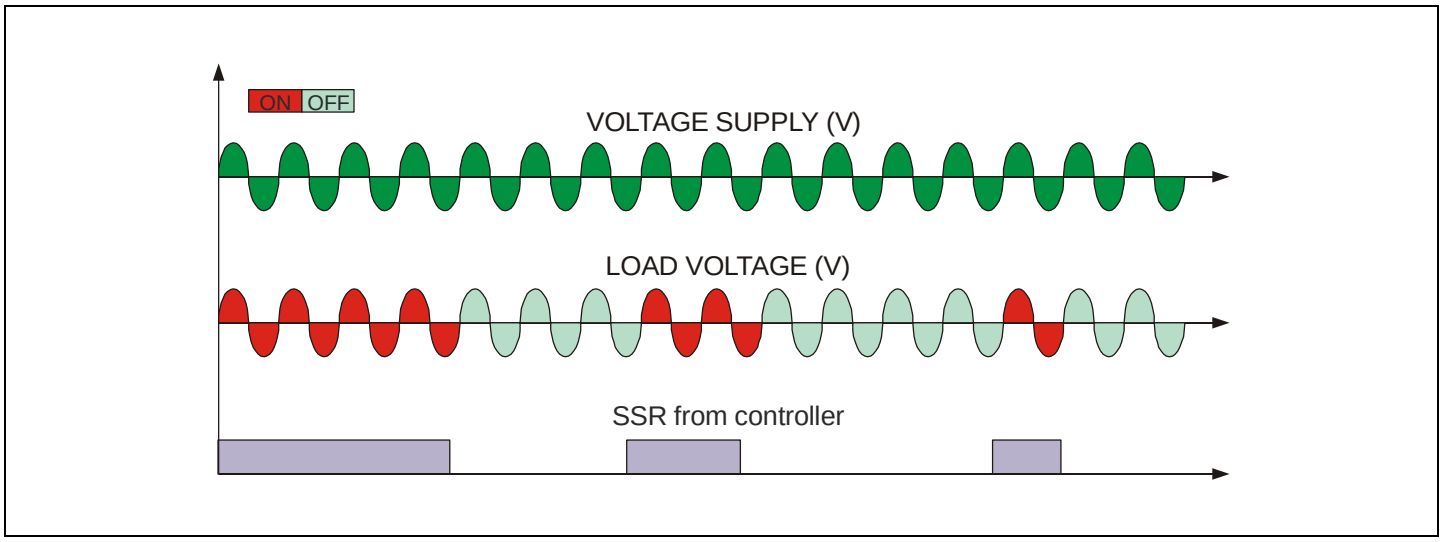
11 Firing type

Choose a correct firing type allows to optimize the thyristor unit for the installed load.
The firing type has already configured in line with customer requirements,Zero Crossing for SSR input and Burst firing for Analog Input.

Caution: *this procedure must be performed only by qualified persons.*

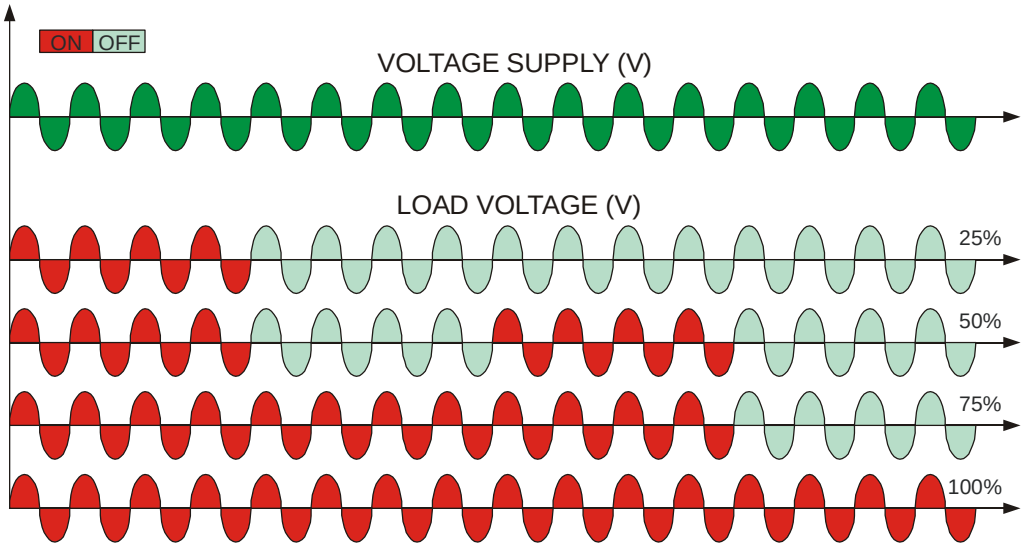
11.1 Zero Crossing (ZC) with SSR input

ZC firing mode is used with Logic Output from temperature controllers and the Thyristor operates like a contactor.
The Cycle time is performed by temperature controller. ZC minimizes interferences because the Thyristor unit switches ON-OFF at zero voltage.



11.2 Burst Firing (BF) with Analog Input

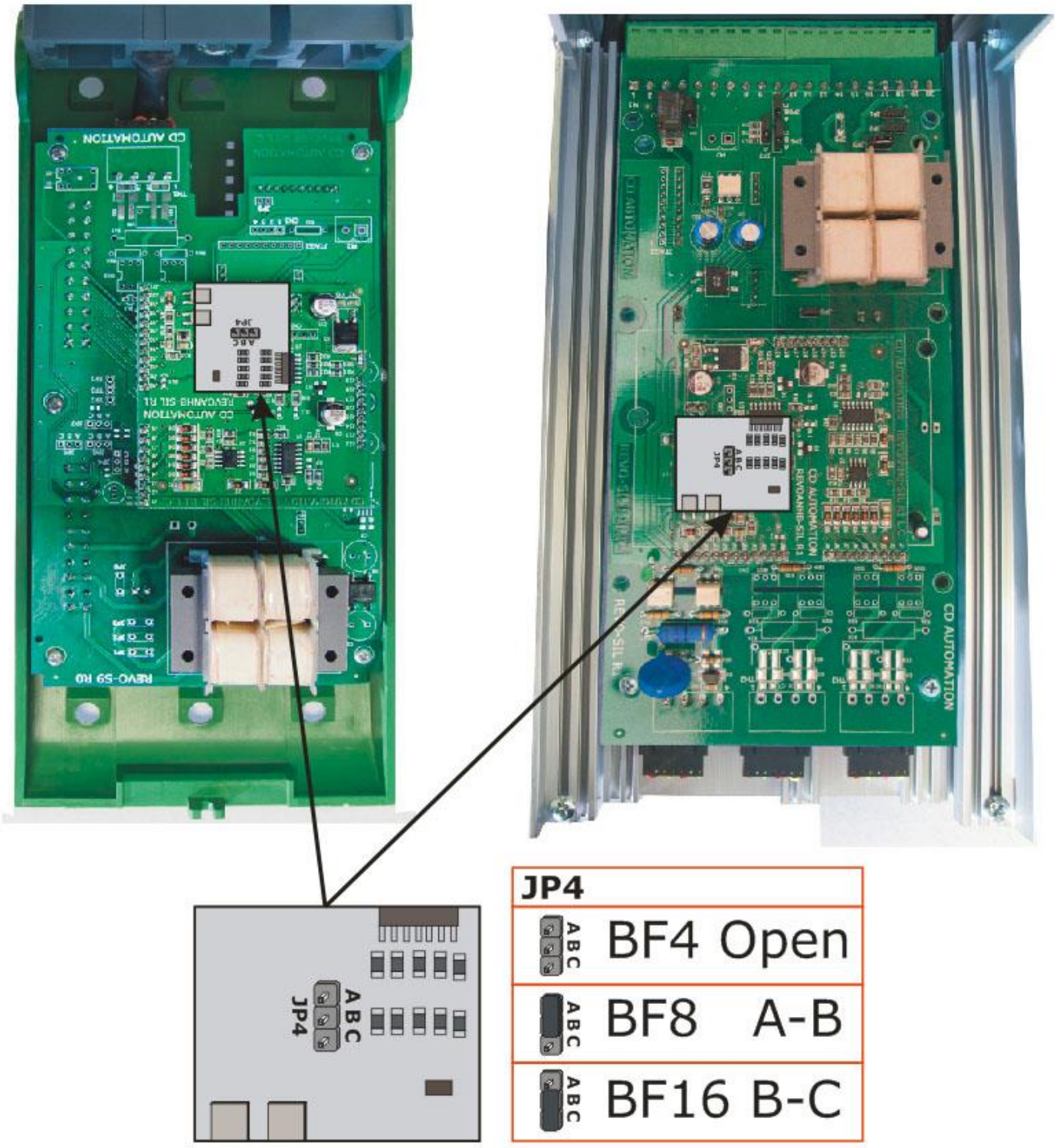
The Burst Firing is similar to the Single Cycle, but consecutive cycles ON are selectable between 2 and 255, with input signal equal at 50%.
Burst Firing is a method zero crossing that it reduces the electromagnetic interferences because the thyristor switches at zero voltage crossing.
The example show the Burst Firing with Burst cycles: 4



11.3 Burst Firing settings

The Burst Firing cycles is already configured in line with customer requirements that are defined in the Order Code. However, if you wish to change the Burst Firing cycles (es. from 4 to 8) set the jumpers as below represented:

Warning: *Before operate, be sure that power and control cables are isolated from voltage sources*



12 Internal Fuse

The thyristor unit have internal fuse extrarapid at low I^2t for the thyristor protection of against the short-circuits.
The Fuses must have I^2t 20% less than thyristor's I^2t. The warranty of thyristor is null if no proper fuses are used.

Size	200 kARMS Symmetrical A.I.C.				Qty
	Fuse CODE	Current (A RMS)	I^2T (A^2sec)	Vac	
280A (S10)	2 x 20 559 02.200	400	52000	690	2
400A (S14)	FU550FMM	550	193500	660	2
450A (S14)	2 x FU315FMM	630	277200	660	2
500A (S14)	2 x FU315FMM	630	277200	660	2
600A (S14)	2 x FU450FMM	900	378000	660	2
700A (S14)	2 x FU450FMM	900	378000	690	2

Caution: *High speed fuses are used only for the thyristor protection and can not be used to protect the installation.*

Caution: *The warranty of thyristor is null if no proper fuses are used. See tab.*

Warning: *When it is supply, the Thyristor unit is subject to dangerous voltage, don't open the Fuse-holder module and don't touch the electric equipments.*

13 Maintenance

In order to have a corrected cooling, the user must clean the heat-sink and the protective grill of the fans. The frequency of this servicing depends on environmental pollution.
Also check periodically if the screw for the power cables and safety earth are tightened correctly (See Connection Diagram)

13.1 Trouble Shooting

Small problems sometimes can be solved locally with the help of the below tab of trouble shooting.
If you don't succeed, contact us or your nearest distributor.

Symptom	Indication on front unit	Possible reasons of the symptom	Actions
Load current doesn't flow	Green LED (ON) light OFF	• No Auxiliary Voltage • No input signal • Reversed polarities of input signal	• Give auxiliary voltage supply (See Connection Diagram) • Provide to give input signal • Reverse the input signal polarity
	Green LED (ON) light ON	• Fuse failure • Load connection interruption • Load failure: The yellow led (HB) is light on (with HB option) • Thyristor fault: The red led (SC) is light on (with HB option)	• Change the fuse • Check the wiring • Check the load • Change the thyristor module
Load current flow also without input signal	Red LED (SC) light on	• Wrong wiring • SCR short circuit	• Check the wiring • Change the thyristor module
Current flows at nominal value but Yellow LED (HB/SC) is light on	Yellow LED (HB) light on or Red LED (SC) light on	• HB circuit not tuned • Current transformers not properly wired	• Make HB calibration procedure • Check current transformers wiring
Thyristor unit doesn't work properly		• Auxiliary voltage supply out of limits • Wrong input signal selection. • Wrong input signal calibration (out of range)	• Verify the auxiliary voltage supply • Control input signal setting. • Check input setting

13.2 Warranty condition

CD Automation gives a 12 months warranty to its products.
The warranty is limited to repairing and parts substitution in our factory and does exclude products not properly used and fuses.
Warranty does not include products with serial numbers deleted. The faulty product should be shipped to CD Automation at customer's cost and our Service will evaluate if product is under warranty terms.
Substituted parts remain of CD Automation property.

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